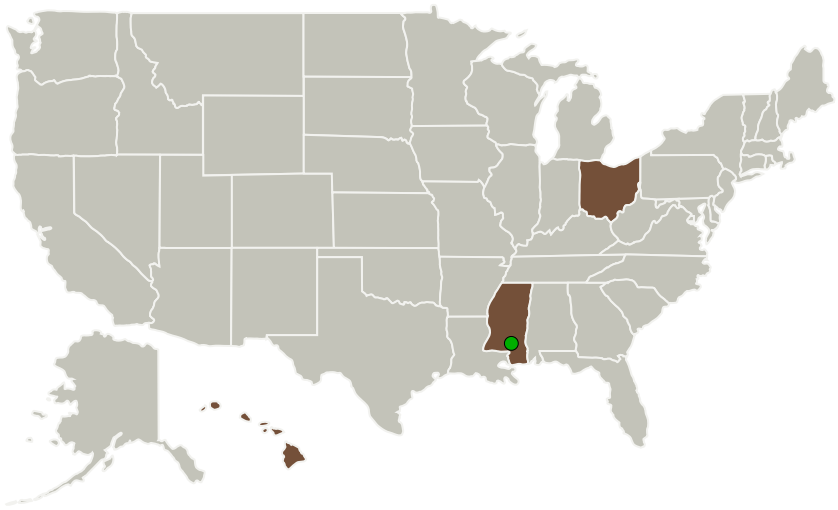
Gaseous Helium Reclamation at Rocket Test Systems, Phase I

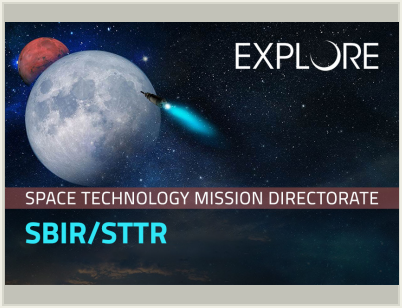
Completed Technology Project (2010 - 2011)

Project Introduction

The ability to restore large amounts of vented gaseous helium (GHe) at rocket test sites preserves the GHe and reduces operating cost. The used GHe is vented into the atmosphere, is non-recoverable, and costs NASA millions dollars per year. Helium, which is non-renewable and irreplaceable once released into the atmosphere, is continuously consumed by rocket test facilities at NASA centers such as KSC, SSC, and CCAFS at a rate of more than 6.6 Mscf per year. This use is projected to increase to more than 10 Mscf by the year 2018, assuming the same inefficient and costly operating procedures and facilities continue to be used. Given the decrease in the world's supply of helium, NASA is heading toward to an economic, operational, and programmatic disaster. New and highly innovative approaches are required to drive down launch operation life cycle costs. Scaling-up of existing systems to meet an increased demand of helium is not an option. Our team, Sierra Lobo, Inc. and University of Hawaii at Manao, proposes the use of PEM fuel cells to remove most of the impure oxygen and hydrogen in the helium gas stream. The small traces of oxygen and hydrogen impurities in the GHe will be removed by cryo-separation using commercial cryocoolers.

Primary U.S. Work Locations and Key Partners





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Organizations Performing Work	Role	Type	Location
Sierra Lobo Inc.	Lead Organization	Industry Small Disadvantaged Business (SDB)	
Stennis Space Center(SSC)	Supporting Organization	NASA Center	Stennis Space Center, Mississippi
University of Hawaii Maui College	Supporting Organization	Academia	Kahului, Hawaii

Primary U.S. Work Locations	
Hawaii	Mississippi
Ohio	

Project Transitions

January 2010: Project Start

January 2011: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/140130)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Sierra Lobo Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Mark S Haberbusch

Co-Investigator:

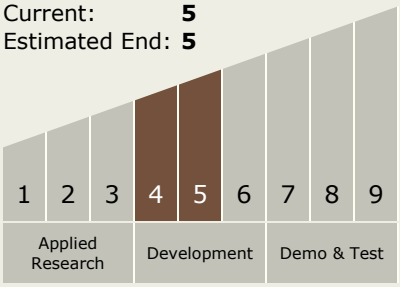
Mark S Haberbusch

Gaseous Helium Reclamation at Rocket Test Systems, Phase I

Completed Technology Project (2010 - 2011)

Technology Maturity (TRL)

Start: **4**
Current: **5**
Estimated End: **5**



Technology Areas

Primary:

- TX13 Ground, Test, and Surface Systems
  - TX13.1 Infrastructure Optimization
    - TX13.1.3 Commodity Recovery

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System